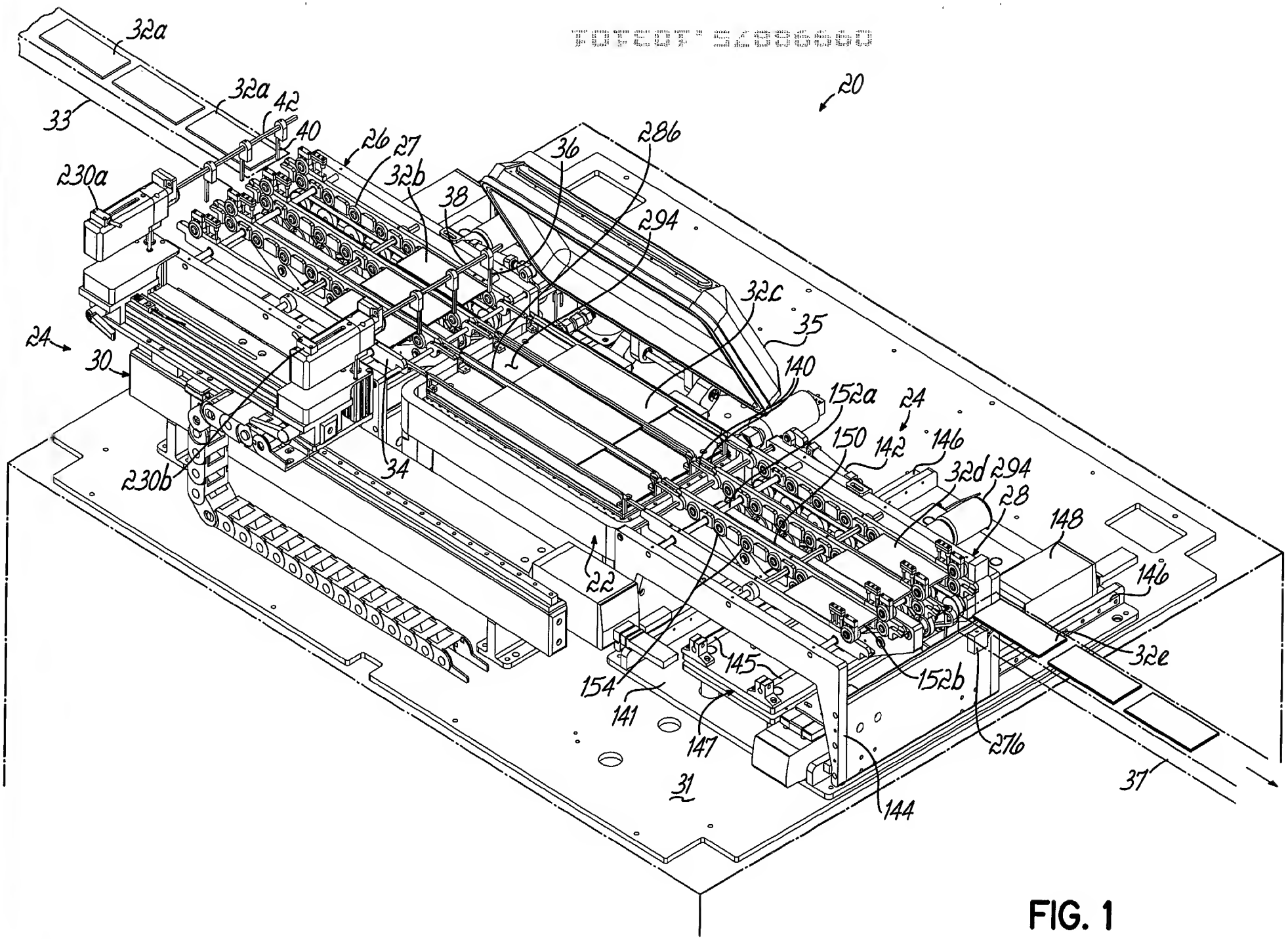
20
32a
33
42
40
26
27
32b
38
36
286
294
230a
24
30
230b
34
32c
35
140
152a
150
142
146
32d
28
148
22
145
154
141
147
152b
276
144
31
32e
37

FIG. 1

PATENT SZ98666660

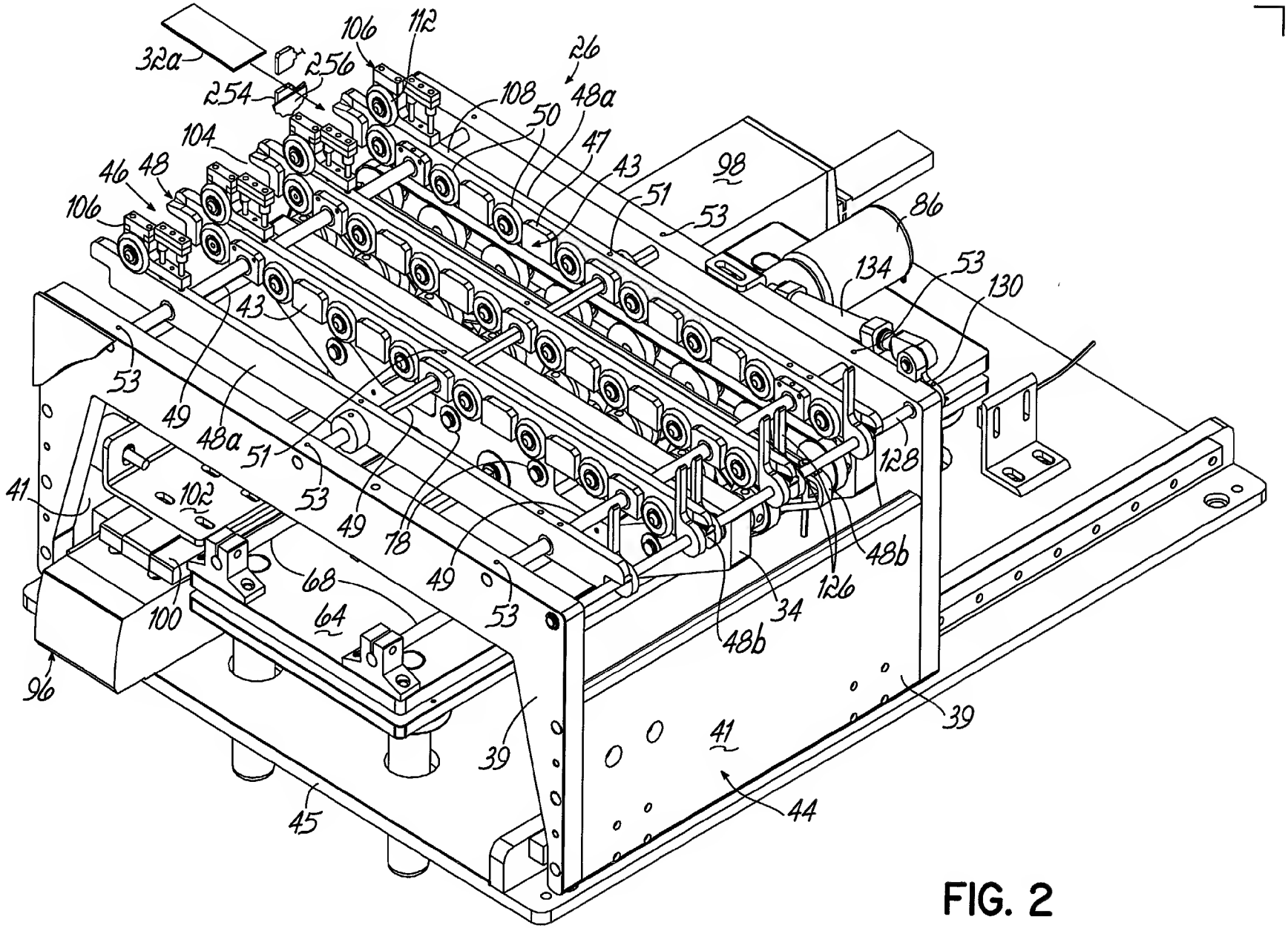

FIG. 2

PATENT 5,236,650

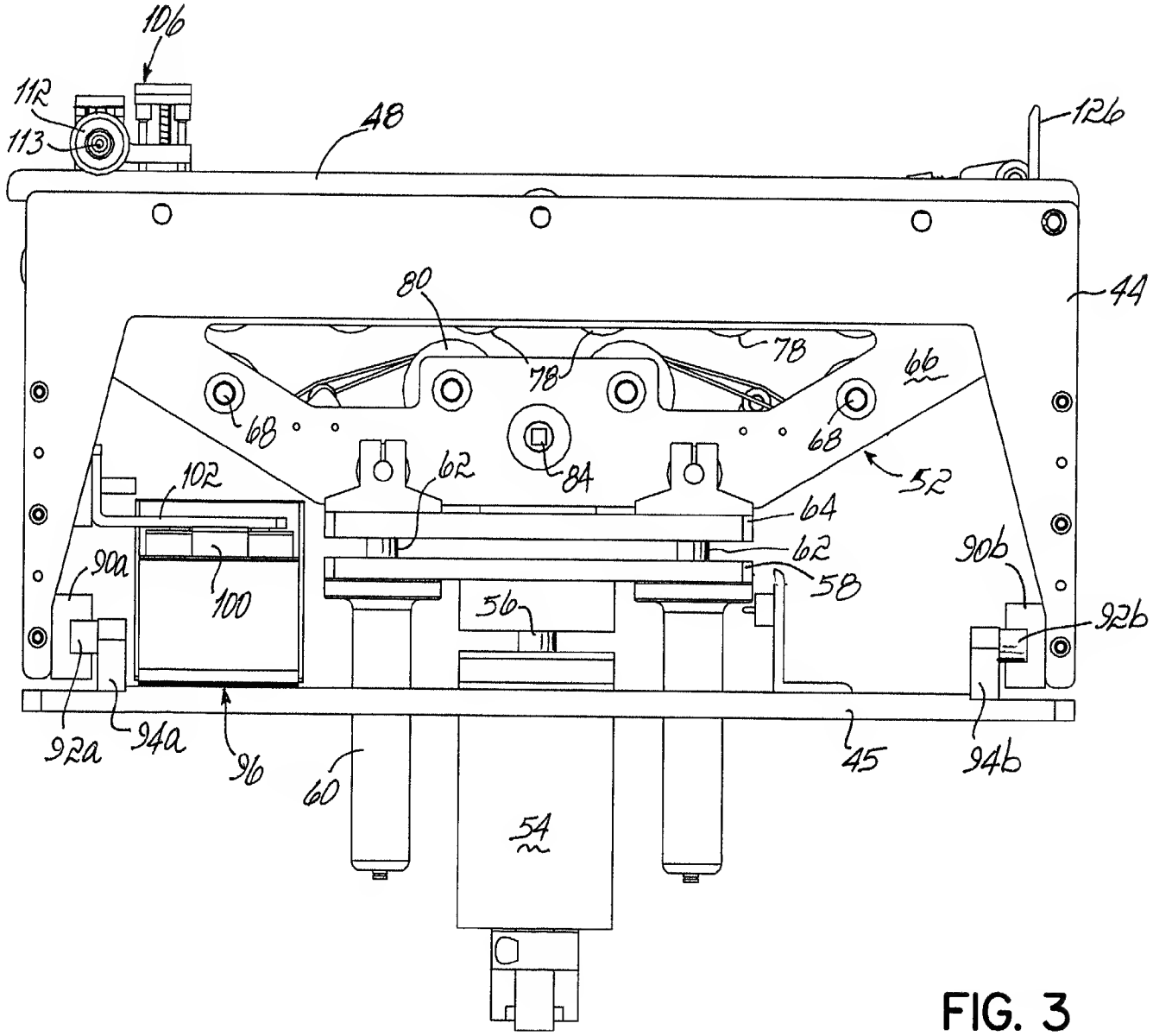

FIG. 3

FOREST 52805560

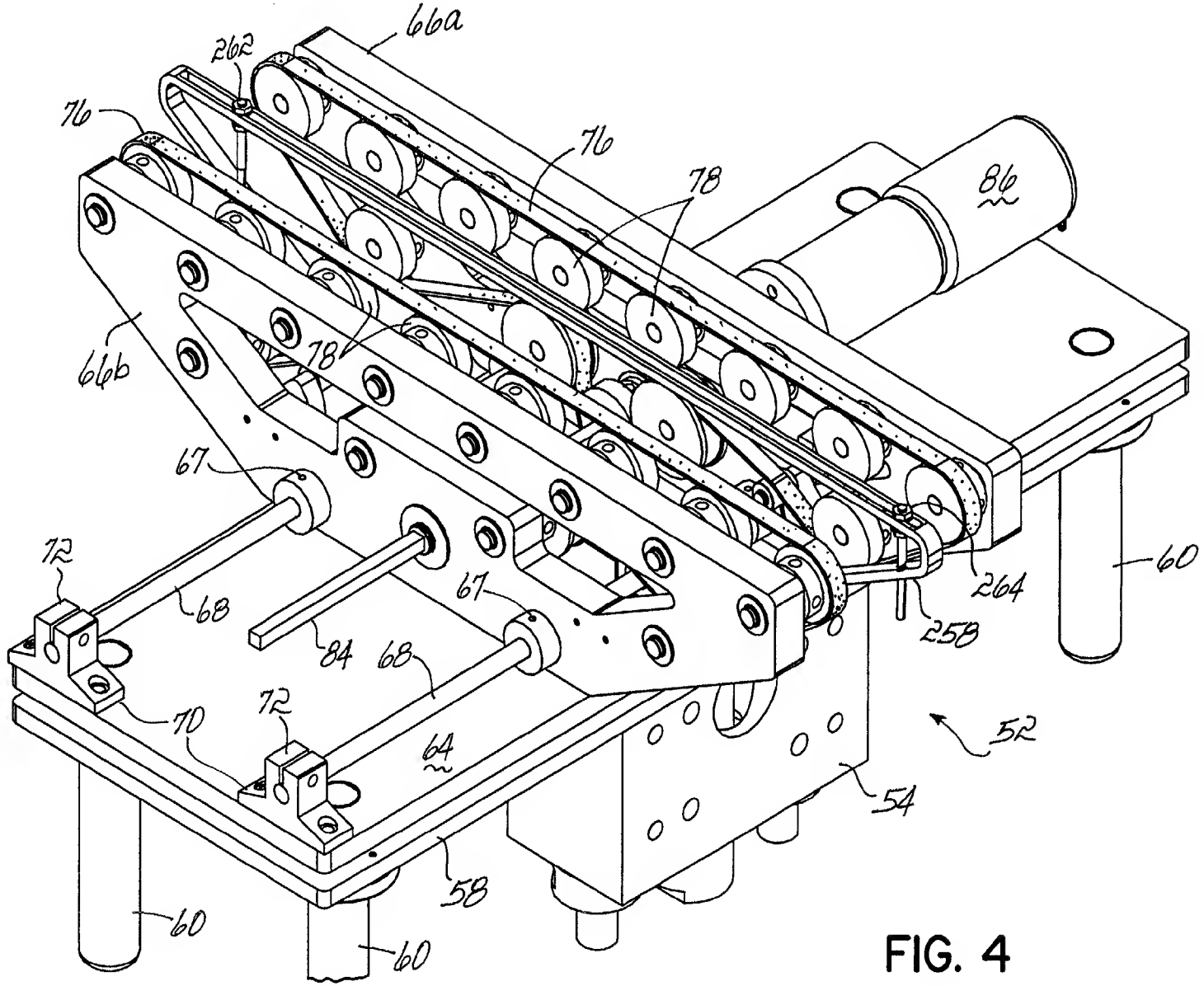

FIG. 4

FOREIGN PATENT

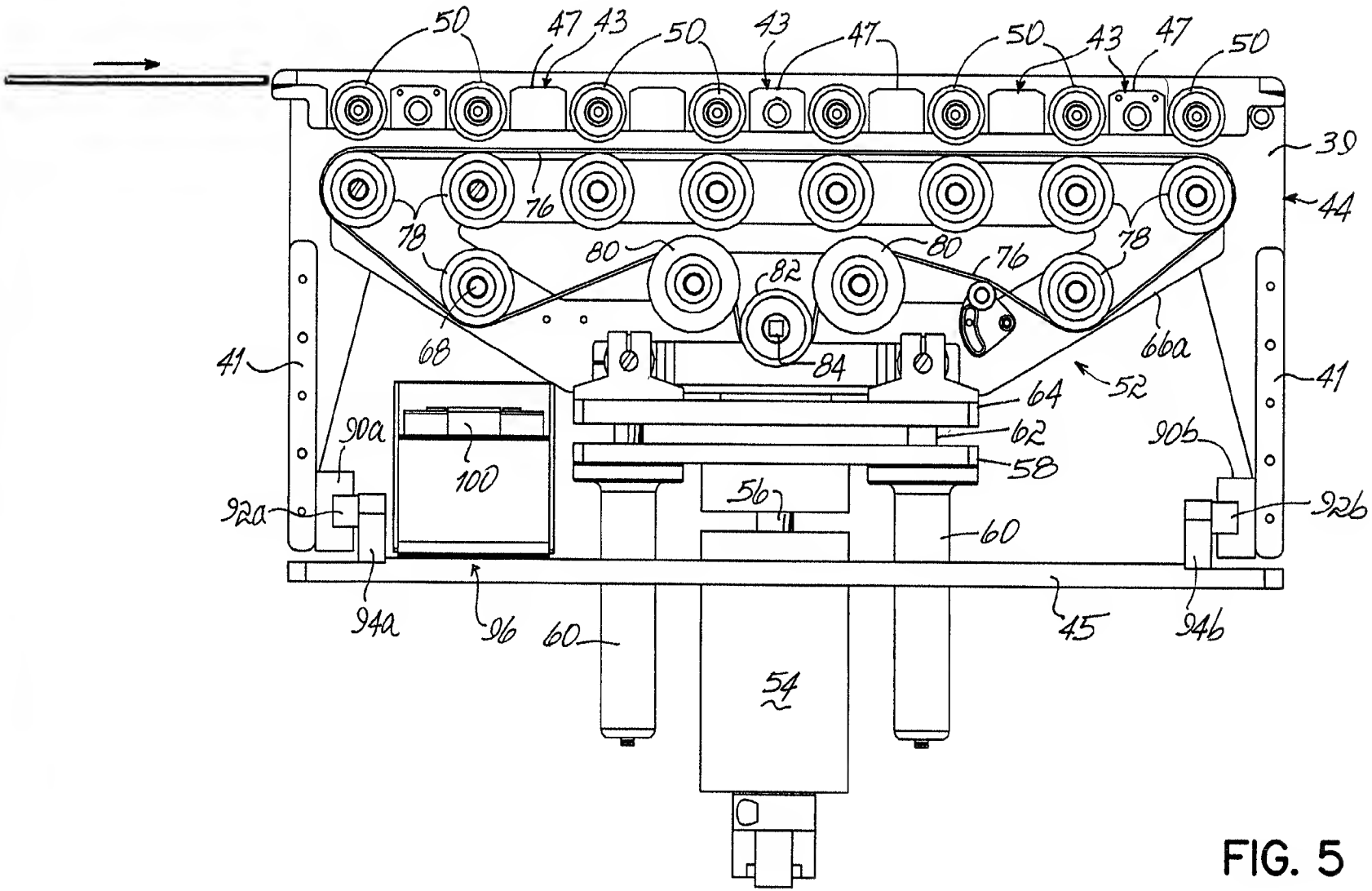

FIG. 5

PATENT APPLICATION

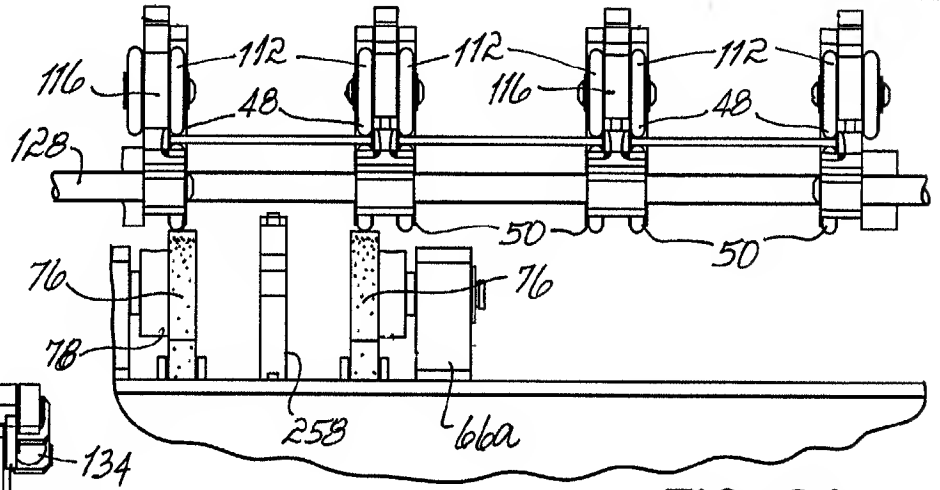

FIG. 6A

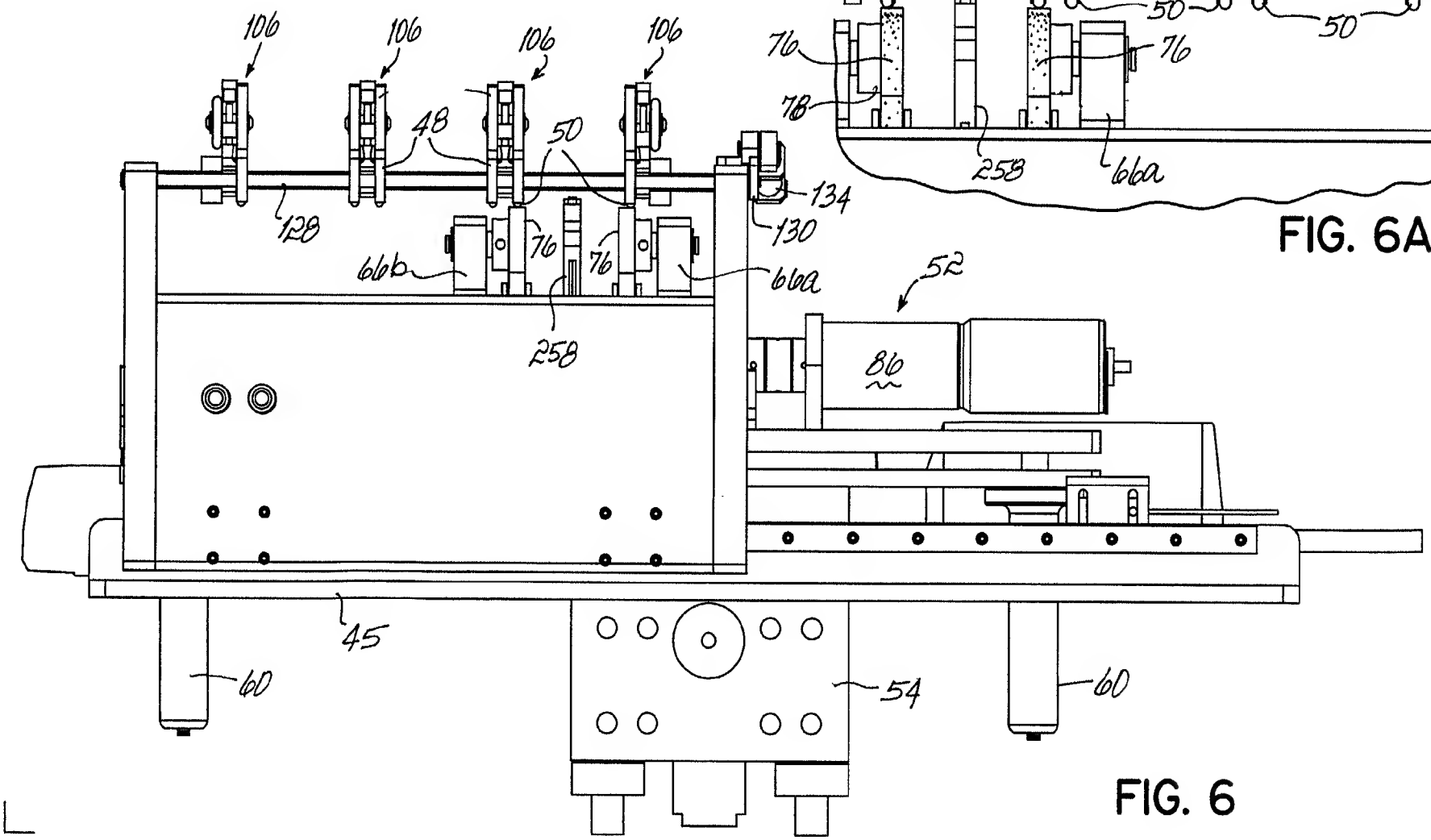

FIG. 6

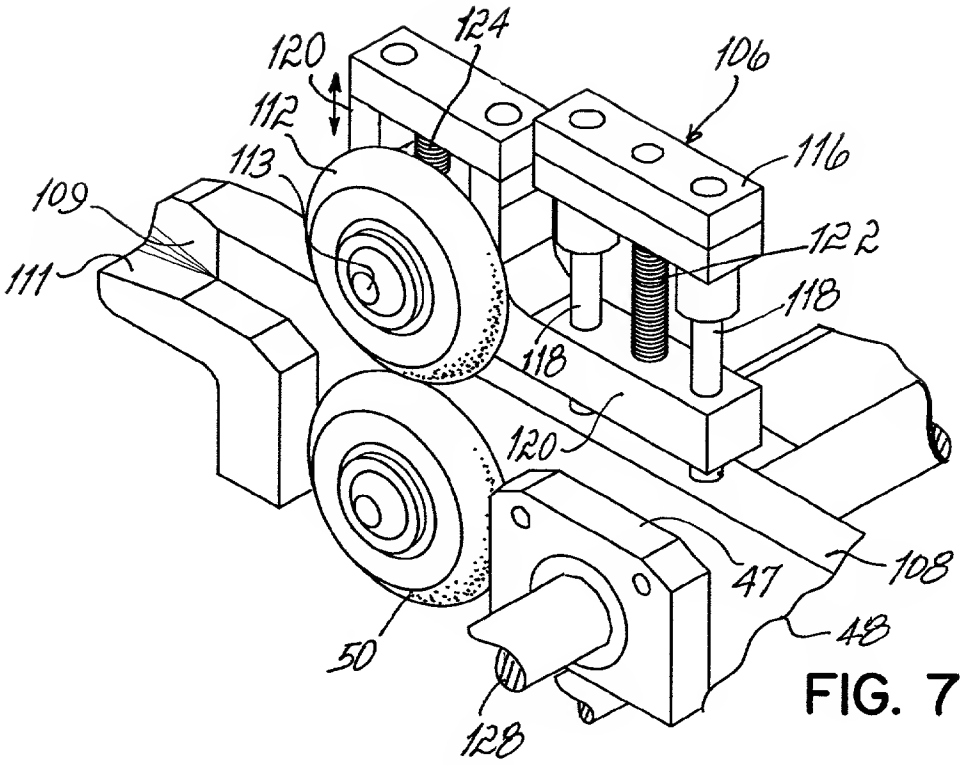

FIG. 7

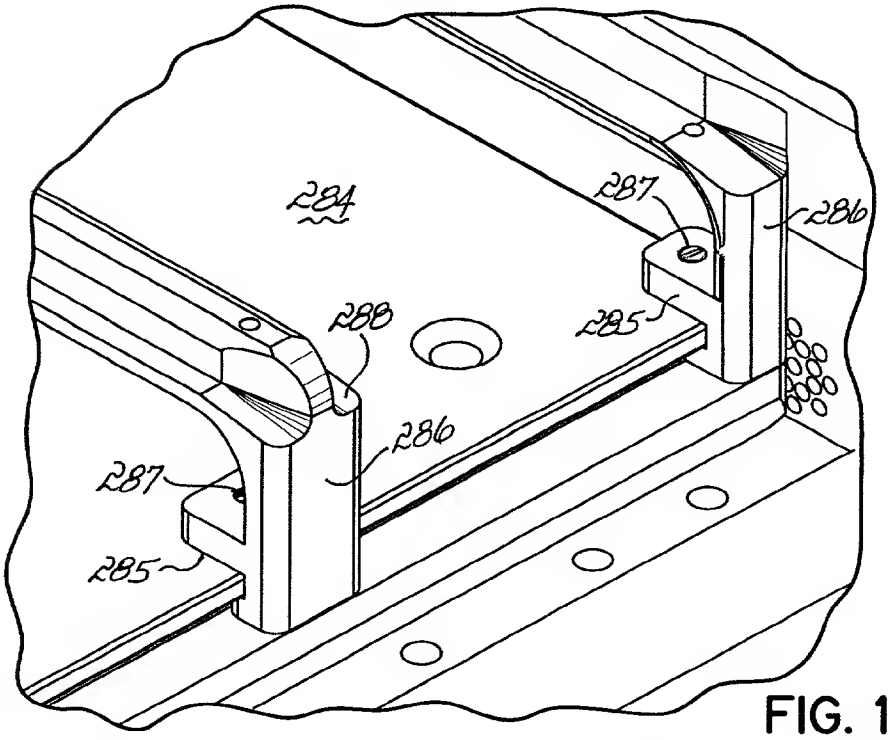

FIG. 13

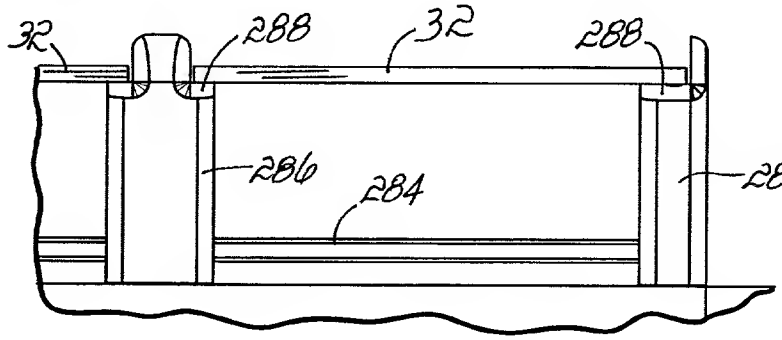

FIG. 14

TOPSOF"52886650

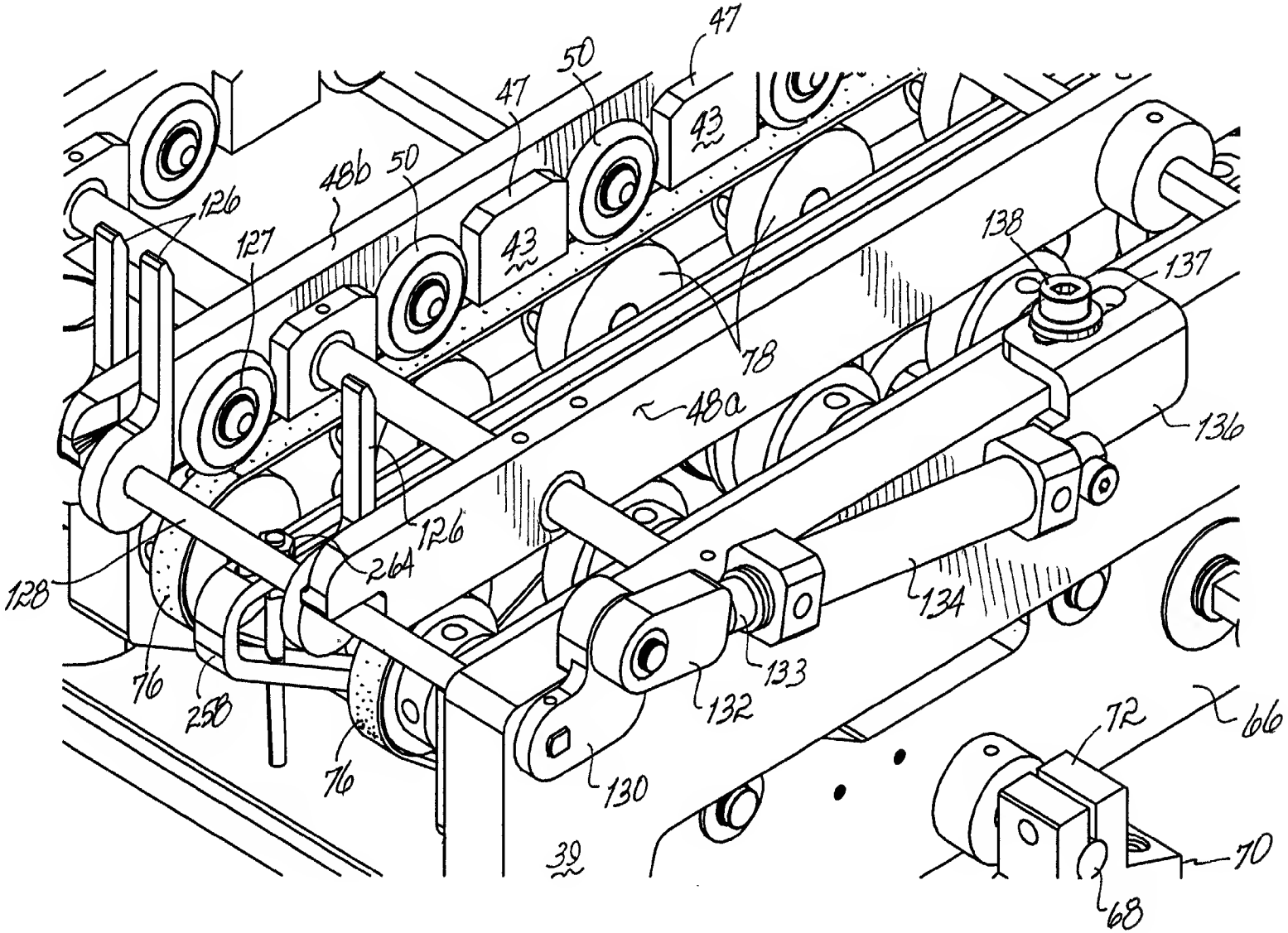

FIG. 8

PATENT 5,388,660

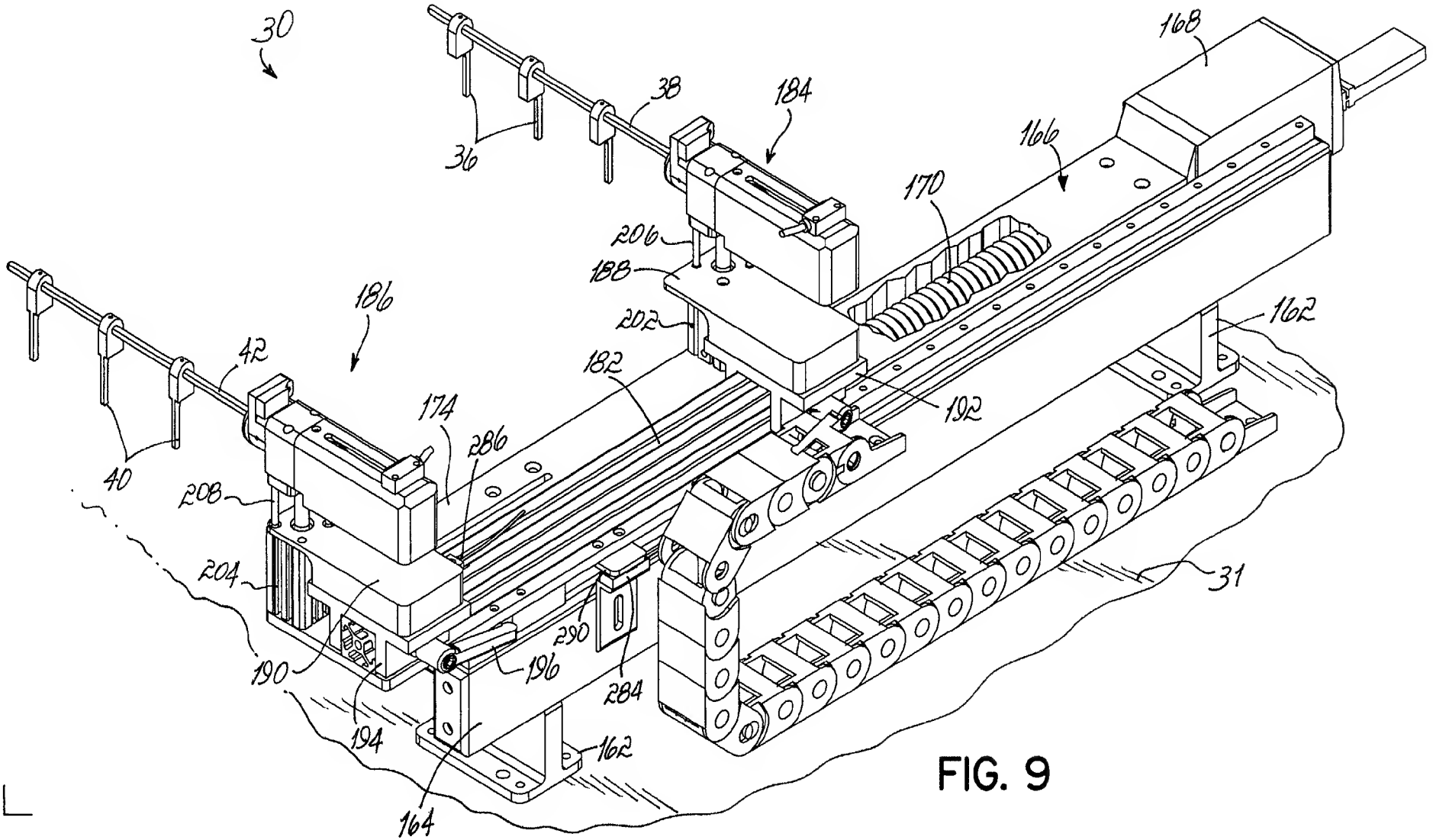

FIG. 9

EXHIBIT 2006

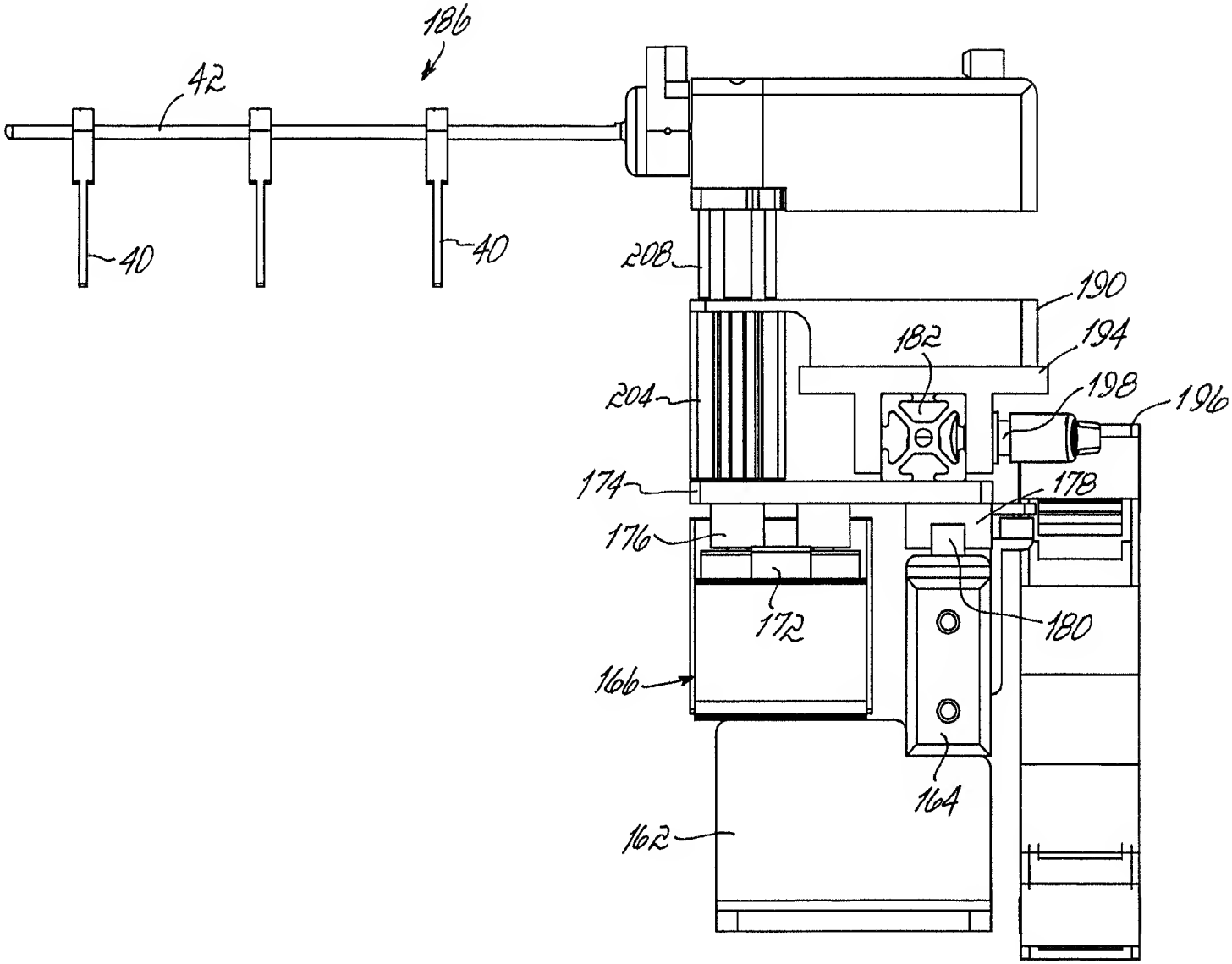

FIG. 10

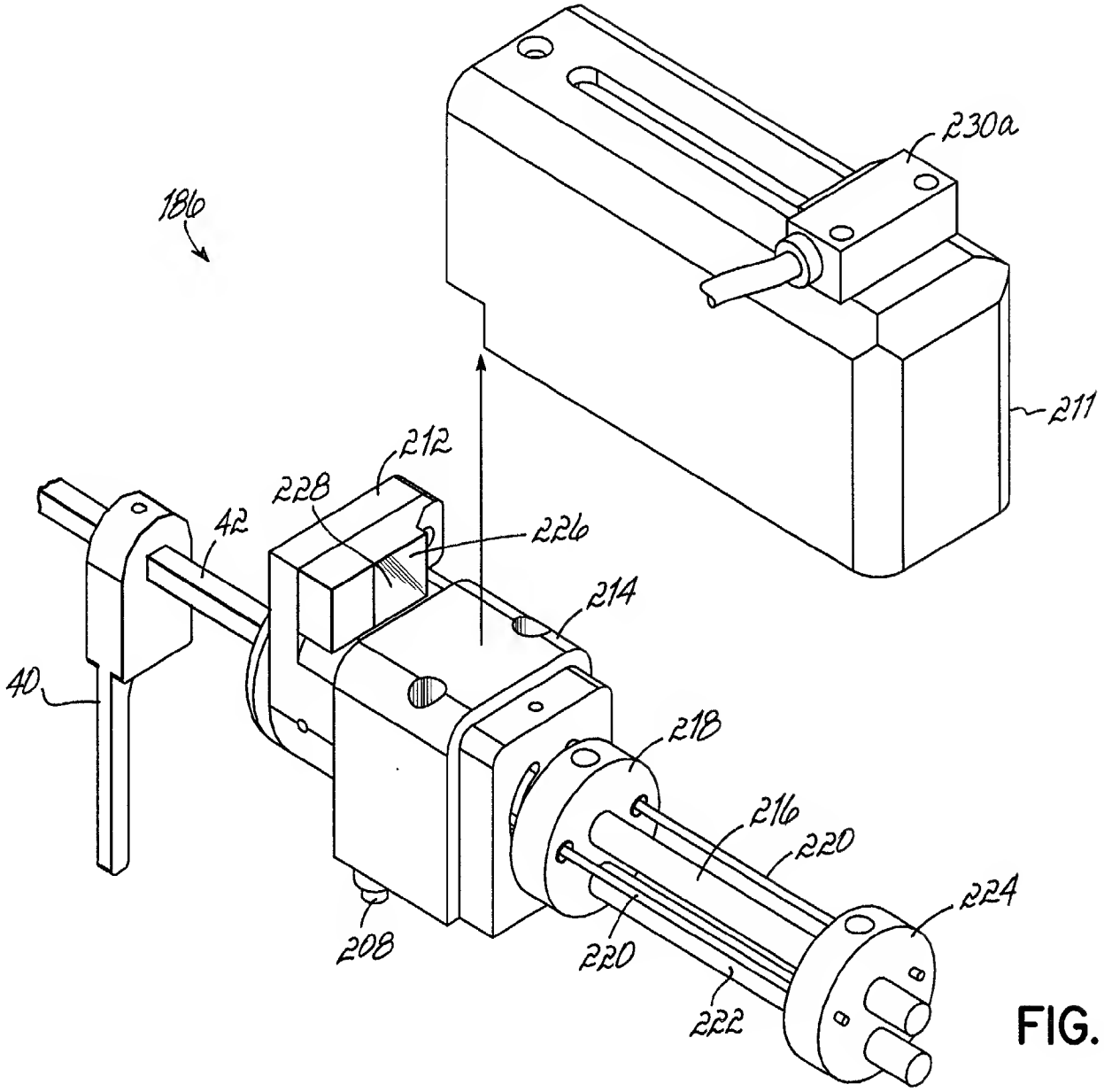

FIG. 11

Patent Application Publication

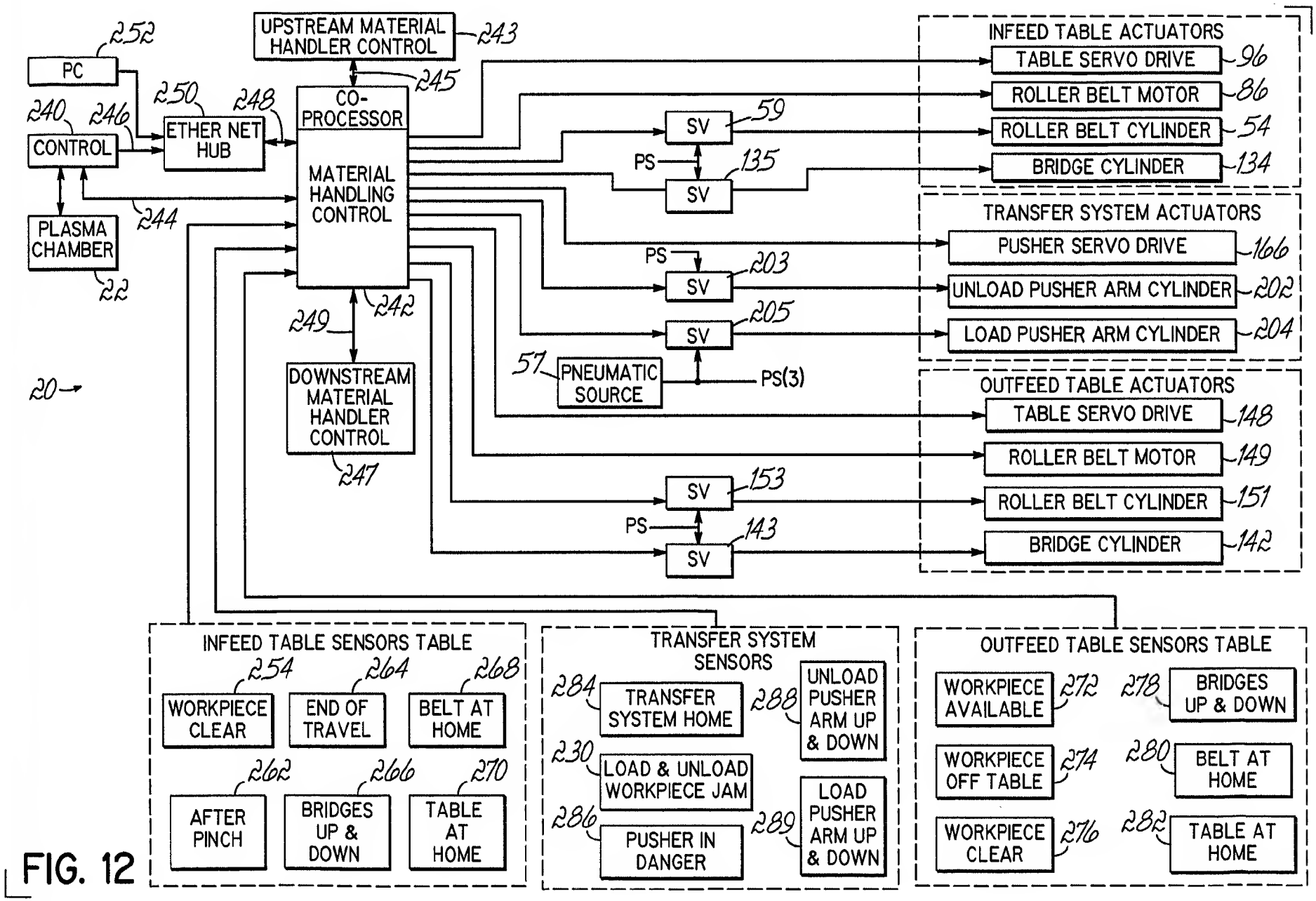

FIG. 12

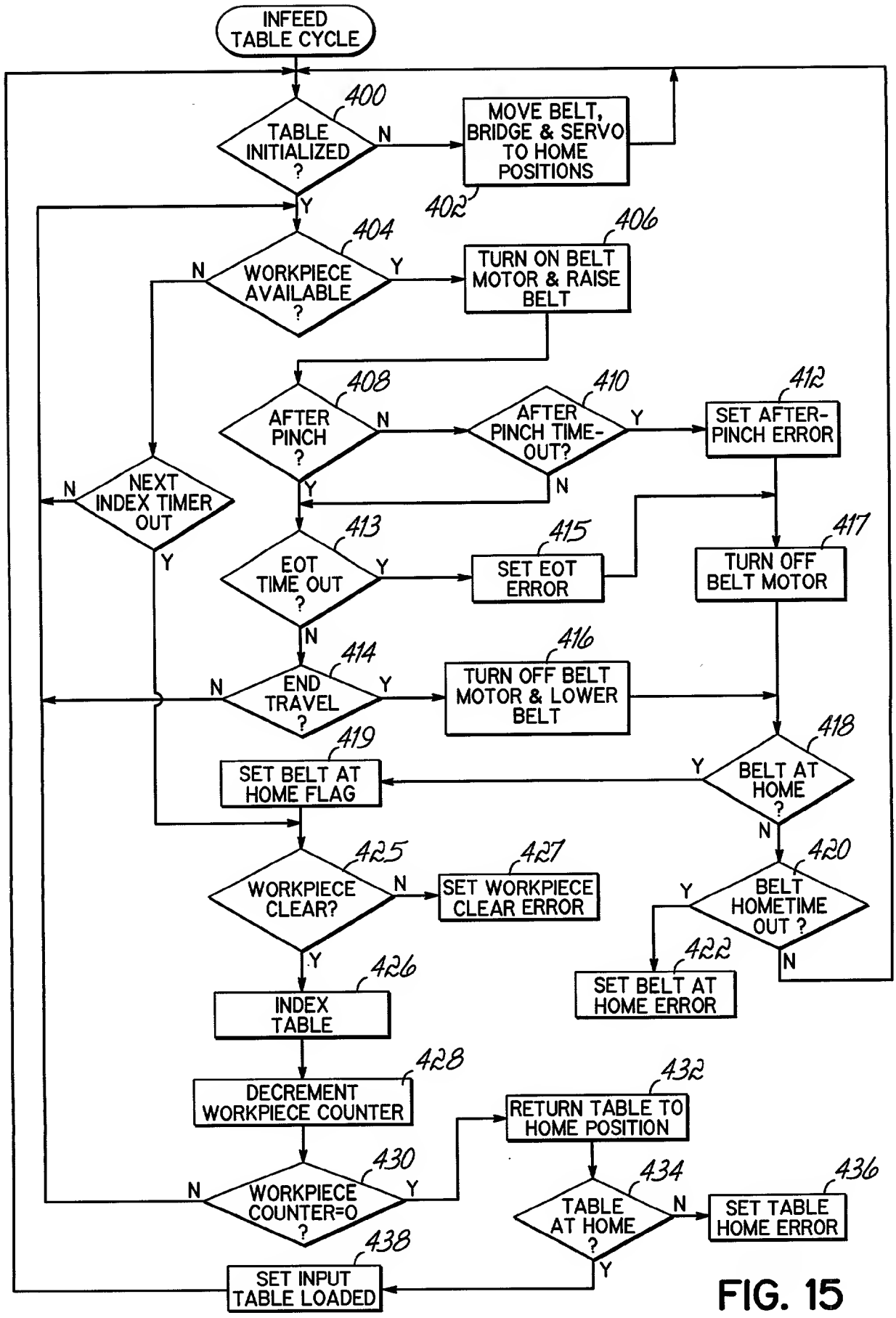
INFEED TABLE CYCLE
400
TABLE INITIALIZED ?
N
MOVE BELT, BRIDGE & SERVO TO HOME POSITIONS
402
Y
404
WORKPIECE AVAILABLE ?
N
Y
406
TURN ON BELT MOTOR & RAISE BELT
408
AFTER PINCH ?
N
410
AFTER PINCH TIME-OUT?
Y
412
SET AFTER-PINCH ERROR
N
Y
NEXT INDEX TIMER OUT
N
Y
413
EOT TIME OUT ?
Y
415
SET EOT ERROR
417
TURN OFF BELT MOTOR
N
414
END TRAVEL ?
N
Y
416
TURN OFF BELT MOTOR & LOWER BELT
418
BELT AT HOME ?
Y
419
SET BELT AT HOME FLAG
N
425
WORKPIECE CLEAR?
N
427
SET WORKPIECE CLEAR ERROR
420
BELT HOMETIME OUT ?
Y
N
422
SET BELT AT HOME ERROR
Y
426
INDEX TABLE
428
DECREMENT WORKPIECE COUNTER
432
RETURN TABLE TO HOME POSITION
430
WORKPIECE COUNTER=0 ?
N
Y
434
TABLE AT HOME ?
N
436
SET TABLE HOME ERROR
Y
438
SET INPUT TABLE LOADED

FIG. 15

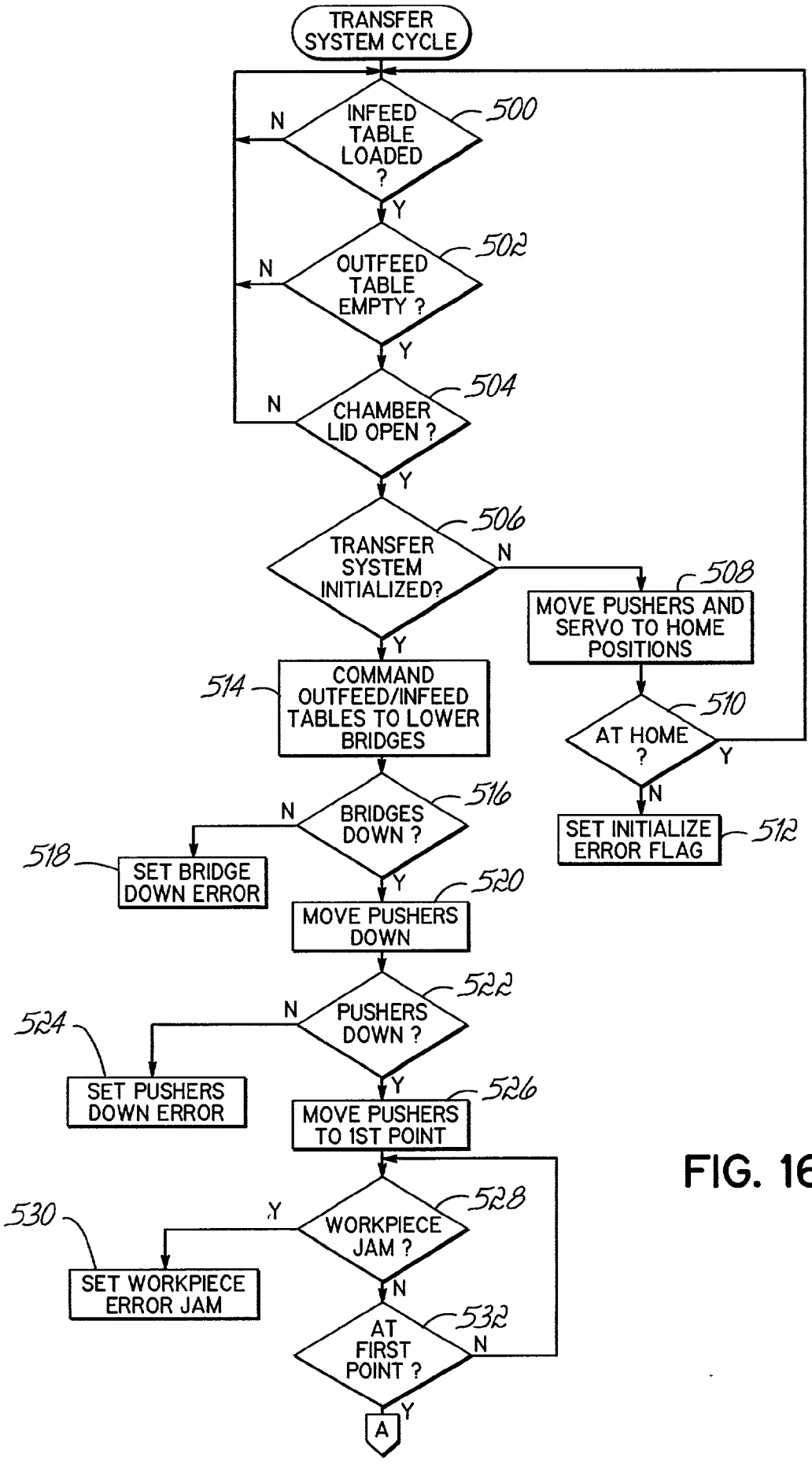
TRANSFER SYSTEM CYCLE
INFEED TABLE LOADED ?
500
N
Y
OUTFEED TABLE EMPTY ?
502
N
Y
CHAMBER LID OPEN ?
504
N
Y
TRANSFER SYSTEM INITIALIZED?
506
N
Y
MOVE PUSHERS AND SERVO TO HOME POSITIONS
508
AT HOME ?
510
Y
N
SET INITIALIZE ERROR FLAG
512
COMMAND OUTFEED/INFEED TABLES TO LOWER BRIDGES
514
BRIDGES DOWN ?
516
N
Y
SET BRIDGE DOWN ERROR
518
MOVE PUSHERS DOWN
520
PUSHERS DOWN ?
522
N
Y
SET PUSHERS DOWN ERROR
524
MOVE PUSHERS TO 1ST POINT
526
WORKPIECE JAM ?
528
Y
N
SET WORKPIECE ERROR JAM
530
AT FIRST POINT ?
532
N
Y
A

FIG. 16A

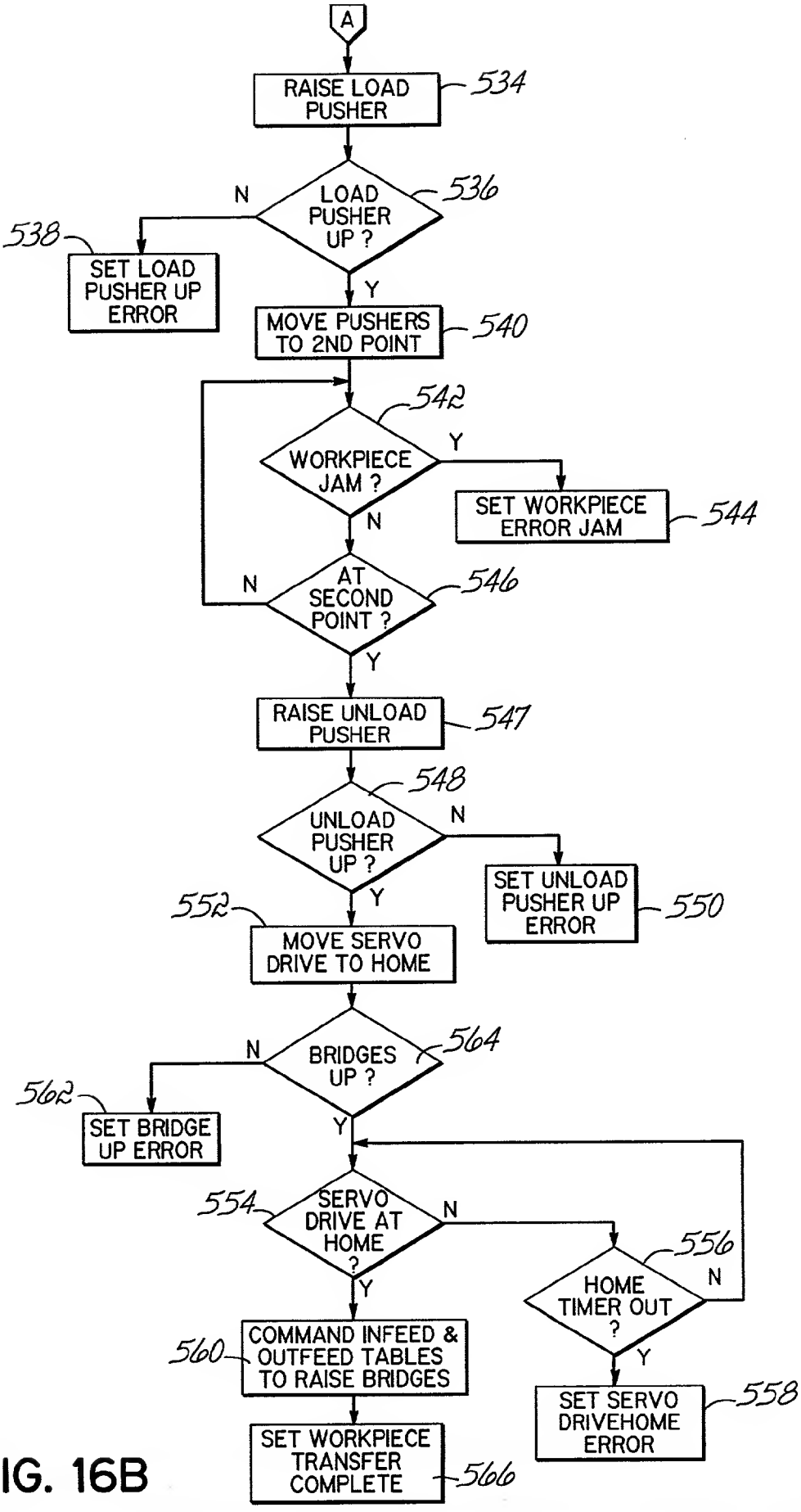
A
RAISE LOAD PUSHER
534
LOAD PUSHER UP ?
536
N
Y
538
SET LOAD PUSHER UP ERROR
MOVE PUSHERS TO 2ND POINT
540
542
WORKPIECE JAM ?
Y
N
SET WORKPIECE ERROR JAM
544
AT SECOND POINT ?
546
N
Y
RAISE UNLOAD PUSHER
547
548
UNLOAD PUSHER UP ?
N
Y
SET UNLOAD PUSHER UP ERROR
550
552
MOVE SERVO DRIVE TO HOME
BRIDGES UP ?
564
N
Y
562
SET BRIDGE UP ERROR
554
SERVO DRIVE AT HOME ?
N
Y
556
HOME TIMER OUT ?
N
Y
560
COMMAND INFEED & OUTFEED TABLES TO RAISE BRIDGES
SET SERVO DRIVEHOME ERROR
558
SET WORKPIECE TRANSFER COMPLETE
566

FIG. 16B

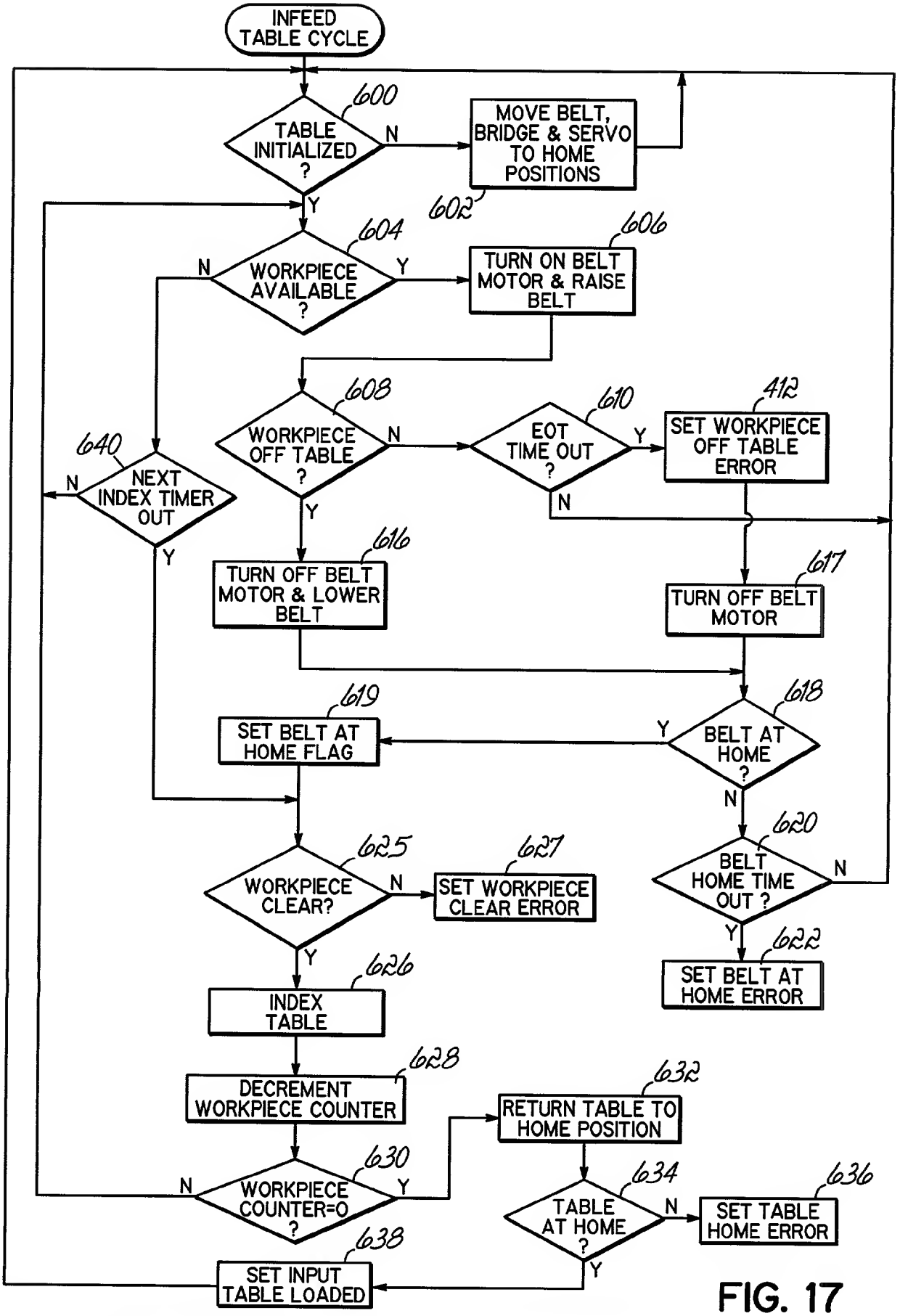
INFEED TABLE CYCLE
600
TABLE INITIALIZED ?
N
MOVE BELT, BRIDGE & SERVO TO HOME POSITIONS
602
Y
604
WORKPIECE AVAILABLE ?
N
Y
606
TURN ON BELT MOTOR & RAISE BELT
608
WORKPIECE OFF TABLE ?
N
610
EOT TIME OUT ?
Y
412
SET WORKPIECE OFF TABLE ERROR
N
640
NEXT INDEX TIMER OUT
N
Y
Y
616
TURN OFF BELT MOTOR & LOWER BELT
617
TURN OFF BELT MOTOR
619
SET BELT AT HOME FLAG
618
BELT AT HOME ?
Y
N
620
BELT HOME TIME OUT ?
N
Y
622
SET BELT AT HOME ERROR
625
WORKPIECE CLEAR?
N
627
SET WORKPIECE CLEAR ERROR
Y
626
INDEX TABLE
628
DECREMENT WORKPIECE COUNTER
632
RETURN TABLE TO HOME POSITION
630
WORKPIECE COUNTER=0 ?
N
Y
634
TABLE AT HOME ?
N
636
SET TABLE HOME ERROR
Y
638
SET INPUT TABLE LOADED

FIG. 17